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ABSTRACT

This paper focuses on an approach to instructional development that consists of three basic stages interrelated by feedback. The first stage, system definition and management, is an exhaustive effort to define the problem, study the existing instructional context, and determine staff support and management controls. Stage two, design analysis and development, results in the development of precise specifications for the messages and the strategies thought to be most appropriate to the resolution of the learning problem and the construction of an instructional prototype. The third stage, prototype tryout and assessment, includes field testing the developed prototype with a representative sample of the target population. During the field test, evaluation data are compiled, which are the basis for the refinement or abandonment of the prototype. (A 5-item annotated bibliography and diagrams illustrating the approach conclude this paper.) (PD)

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# Instructional Development: An Overview
## (An Informal Paper)

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1970



This paper is focused on an approach which has demonstrated tremendous power in creating improved designs for instructional problems. It may well be that some readers may find a more generalizable character in the approach being presented, but the essential intention of this approach is to assist in the resolution of problems related to student learning.

Some students learn on their own, regardless of their environment, but most are dependent on their teachers and the instructional organization of the school. The key to successful instructional programs always depends on the ability of teachers, administrators, and concerned citizens to use their resources wisely. Studies of successful instructional programs always reveal this cooperative network of people, facilities and resources.

In the past few years, this common sense notion of planning and cooperation has generally become known as instructional development. Instructional development is a simple idea but it requires a lot of organization to create it. Instructional development consists of three design stages: I. Systems Definition and Management, II. Systems Analysis and Development, and III. Prototype Tryout and Assessment (Figure 1).

These three stages are all inter-related by the process called feedback. Feedback is the process built into the system which allows the people who designed, or used, or who were taught by the system to provide information about how well it works or doesn't work. Feedback, when working properly, is the readiness of people involved to plan for adjusting and changing the instructional system as it is being developed. Feedback helps to uncover trouble spots or confounding factors in the instructional design. Feedback is the dynamic which keeps instructional development flexible and adapting. It is personal and involves a selective process to direct the right information to the right people at the right time.

Each of the basic design stages (Systems definition and Management, Systems Analysis and Development and Prototype Tryout and Assessment) contains three major design areas. These nine Areas of Instructional Development are presented in Figure 2.

Each of the nine areas of instructional development can be further subdivided into elements. Figure 3 presents the 22 elements in a flow diagram which also presents a reasonable linear flow and indicates

particularly critical check points in the process of developing instructional systems. The system proposed in this paper contains the nine design elements illustrated in Figure 2.

The systems definition and management stage is an exhaustive effort to define clearly and succinctly what is. The felt problem is defined, staff support and management controls determined and the existing instructional context is thoroughly studied.

The Design Analysis and Development Stage depends on the information gathered in Stage one and begins by stating objectives and measures. These objectives are then analyzed in terms of the types of learning required, the conditions that might bring about that learning, accomodation of individual differences and the form of each instructional event. The net result of design Stage two is the development of very precise specifications for the messages and the strategies thought to be most appropriate to the resolution of the learning problem and the construction of an instructional prototype.

As assessment of the individual elements of the prototype have been conducted as they were produced during the development phases, the third stage, Prototype Tryout and Assessment, is concerned with evaluating the complete package. The third design stage then, begins by field testing the developed prototype with a representative sample of the target population. During the field test evaluation data is compiled. The data is then analyzed and the results obtained which provide the basis for determining refinement or abandonment of the prototype.

Instructional development techniques can be presented as a general model. Models always have reasonably clean rationals and the appearance of possessing very clear cut approaches. Unfortunately, few instructional problems ever fit the model precisely. Instructional development is based on a network of people--resources--and facilities. Local variation in time, energy and resources can make it impossible to follow the proposed model. It is at this point that instructional development must depend on the judgment of the people involved. In a sense, instructional development is common sense by design, but to most people who have directed an instructional development effort, instructional development models provide an "un-common" approach. The model insures that all design elements are at least attended to. Many efforts in instructional improvement have been ultimately destroyed by lack of attention to some essential component.

## A Brief Review of the Basic Nine Instructional Development Areas

### 1. Defining the Instructional Problem:

Instructional development activities usually begin with some group or something who can identify an instructional problem they are concerned about. This concern, no matter how simply expressed is the starting point. The end is another matter. As more and more is learned about the problem, by subsequent study and anlysis, the problem definition will go through many revisions. Many related sub-problems will come to light. The decisions to include or to exclude particular problem elements assists in creating sharper definitions of the instructional problem.

Two closely allied design areas are the analysis of the learning setting and the identification of objectives. The information generated by considering these topics generally requires a comprehensive analysis and yields a reorganization of information which can be quite different than the problem as originally expressed.

The initial definition of the instructional problem is a simple statement of what is. Instructional development then proceeds by systematic planning and analysis to determine what we would like to have.

2. Analyzing the Learning Setting

As with the definition of the instructional problem, the primary objective in analyzing the learning setting is to collect as much general information about what is as is possible.

(1) Who is the target audience? How large is it and how much variation among individuals does there seem to be?

(2) A second element in this design area is to collect materials and tests which represent the way the course or curriculum area was previously taught; course syllabi, tests, media materials, references, etc.

(3) A third element is to look at the instructional setting. The classroom environment and/or other facilities used in the instructional program should be examined and analyzed. In the design analysis stage, the information gathered will be useful reference material in determining what, if any, modifications are essential to the successful implementation of proposed instructional prototype.

All materials and information relevant to the instructional problem must be located, collected and/or made accessible to the instructional development team. Creation of a workable solution that provides for efficient use of available resources and facilities is a major step towards creating instructional prototype which can sustain itself.

3. Defining the Staff and Management Controls

One of the most critical points in instructional development is to define the staff and the management controls which have a bearing on the defined problem. This design area may destroy all other components if a proper fit of people, time, energy and money is not found. Faulty analysis in this area alone has faulted many otherwise worthy attempts to improve instruction. The power and influence of groups inside of the system and outside of the system must receive balanced attention.

Inside the school the basic considerations are to achieve a control of responsibility. Controlled responsibility is a dynamic situation in which the instructional development team and their "monitors", from outside the system, know who is charged to accomplish what and what expenditures of resources are available to develop the instructional prototype. Clerical support, finances, available equipment, facilities, etc., all require careful identification or impossible instructional solutions may later be proposed.

The culmination of work in this area should be written specifications for staff responsibilities in each area of instructional development. It is essential that consultants and other support staff in technical or specialty areas be identified and their support enlisted to develop and sustain the program. Administrative liaison must be firmly established. Both formal and informal feedback networks must be set up to insure the proper flow of information into and out of the system.

4. Identify Behavioral Objectives and Performance Measures

The system definition stage should provide a complete set of relevant information about the instructional problem as to "what is". The design analysis and development stage begins with this information, reorganizes it to form new relationships which are stated in the form of objectives. Objectives take two forms: Terminal Objectives and Enabling Objectives.

Terminal objectives are statements which establish the kinds of behavior (cognitive, affective or psychomotor) which represent the "solution" to the instructional problem, i.e., if these objectives were achieved there would be no problem.

Simultaneous to the statement of terminal objectives is the acceptance or development of assessment measures which will be used to evaluate the learner's performance. The performance measures are critical to the final assessment of the instructional system. These measures are the key criterion to determine if the system is accomplishing the purpose for which it exists.

Enabling objectives are statements of intermediate goals which lead to a particular terminal objective. These objectives map out the things the learner must accomplish in order to eventually arrive at the end point. Quite commonly, this analysis takes the form of a lattice or matrix which assists in making decisions about these sub-behaviors. In many cases, clear cut distinctions cannot be made. Serious attention to enabling objectives and their performance measures is a valuable means of arriving at detailed specifications of learning activities, sequences, and priorities.

5. Specify Methods of Learning

With the specification of the performance standards in the forms of terminal objectives, enabling objectives and their corresponding measures it is possible to proceed to the specification of instructional materials. Developing specifications for instructional materials requires that the types of learning, conditions for learning, and adaptations for individual differences be analyzed. It is this information which is essential to the integration of each instructional event.

The broad concern is to develop, through careful analysis, statements which describe the specific learner environment thought to maximize the learning of a particular objective. The results are statements of

learning contexts as we would like to see them. These specifications must detail the essential conditions for learning, the options which are possible and probable for accommodating individuals, the remedial adjuncts to be fitted to "main tract" instruction, the techniques for monitoring student progress and for studying the interactions between individual students and the learning treatment.

Each learning treatment is specified in terms of its assumed potential for obtaining particular enabling objectives which in turn assist in the accomplishment of some particular terminal objective.

Commonly, the form or format of instructional events is dependent upon what resources are available to the instructional development team. The primary objective in determining the form of each instructional event is to analyze alternative human, material and technical components which have the potential to support a specific learning treatment. The essential task is to determine who or what should be used to carry out a given enabling objective.

A number of investigators have offered guidelines which might be used but in practice most instructional development teams rely on their own biases or on the advise of local consultants. In selecting technical modes, there is sometimes an inherent danger of designing instruction to fit a particular format or "gadget" rather than selecting the format which best fits the requirements of the learning experience.

If the instructional development team will work carefully from their statements of enabling objectives and the data generated about those objectives in the specification of methods of learning then they will have considered as many essential conditions as the team was capable of generating. It is easy to "hang up" in this design area. Brief field trials, when possible, usually assist in resolving these issues. If field trials are not possible, be very sensitive to student confusion, boredom, resistance and passiveness in the prototype tryout.

## 6. Construction of the Instructional Prototype

The instructional prototype begins as an "on paper" design which includes all pertinate instructional components and arranges them into the combinations and sequences which are judged best to solve the instructional problem. During the design analysis and development stage a detailed breakdown of content, media, materials, and learning experiences has been provided. The primary function of this construction area is to determine if the content, media, materials, and methods selected for the instructional design can be used to accomplish the purpose of the system.

Prototype development begins by preparing an outline of all developmental work that needs to be done. Timelines are established and tasks assigned to appropriate team members. Each component proposed for the instructional system is reviewed and sequenced into the prototype. As the prototype begins to take shape, tryout assessment points are designed in for future referencing. Tryout schedules are established, arrangements made with pilot population, and any advance preparation of the facilities or training of the instructional staff should be carried out.

The prototype is completed when all materials, facilities, and people are ready to go. The design prototype, "on paper", has now achieved the status of the "tryout" prototype.

## 7. Test Instructional Prototype

The initial tryout usually takes place using a sample of the target population. All essential elements of the instructional program must be present. If less than a total system is being tried out then at least a complete instructional sequence must be used. Instructional development teams must always be aware that the real test of the program comes after the developmental phases when the program is required to sustain itself in the total educational environment.

As measurements are taken of student progress and accomplishment, both the objectives, terminal and enabling, as well as the test measures themselves must be critically examined to gather feedback information about how well the proposed instructional solution is working. Observational data during early tryouts of all participants, teachers, and students, can be of value. Notations of learner reactions, cooperation, resistance, passiveness, confusion, clarity, interested, boredom, pacing, timing of events, etc., are all helpful signposts.

## 8. Analyze the Tryout Results and Test Instruments

As the data from the tryout become available the instructional development team now becomes concerned with identifying where the system is working or not working and the reasons. The comprehensive analysis of all system elements brings the team to the final major area of instructional development.

## 9. Decision of System Development: Implement/Recycle

If feedback has been carefully recorded from both formal and informal information networks, it is now possible to determine what kinds of trade offs must be made in the design. In some cases the economy of the system, in terms of time, people, or money, may mean the abandonment of the system until those management constraints can be removed. In some cases the prototype will need to be recycled through a few or many of the instructional development areas. In most cases, some modification will be required. Each of the noted changes becomes a sub-instructional problem which can generally be recycled quickly through each of the design areas.

Decisions depend on people. People who have followed the instructional development system should have access to the kinds of information which can help them make reasonable decisions about next steps. The instructional development system is a guide not a solution. It is a process not a product. The instructional development team should be able to create an instructional solution, to know how well it worked and to know why it worked.

## A Final Word or Two

Instructional development systems vary from very simple ones, like the one presented in this paper, to extremely complex ones, as used in military systems development. As systems they are not perfect. As systems they require adaptation to fit particular problems or the biases of particular instructional development teams.

The philosophy of instructional development is relatively simple; the science of instructional development is highly complex and incomplete! You can only learn about instructional development by experiencing it with real problems, in real time, with real people. Instructional development is a commitment requiring an extensive network of people, resources and time. Instructional development is dependent upon the flow of information, and feedback between people to control the quality of the instructional system and to keep it dynamic and adapting. Instructional development systems are systematic sets of procedures which help insure that no pieces of the instructional puzzle are left out.

Instructional development is "uncommon" sense, by design.

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Figure 1.

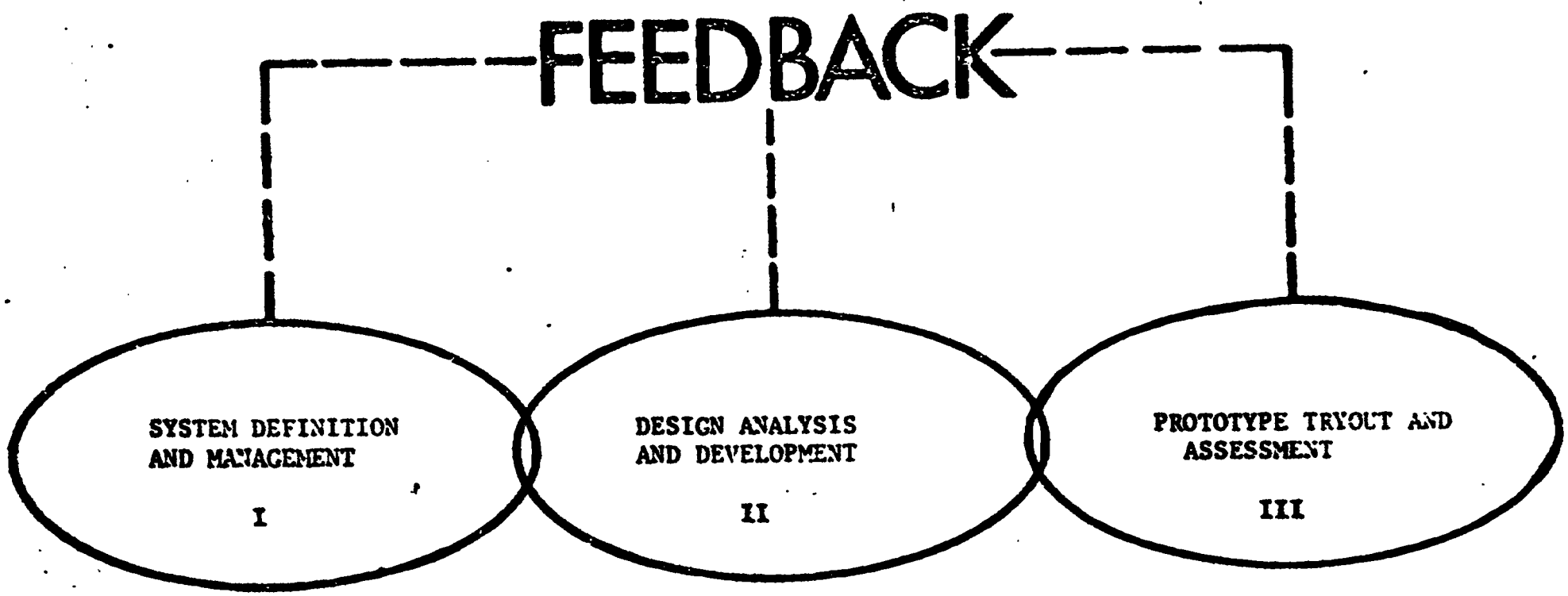


FIGURE 2

## Instructional Development System

### STAGE I: DEFINE

**Function 1**

DEFINE PROBLEM
- Needs assessment
- Establish priorities
- Make a commitment

**Function 2**

ANALYZE SETTING
- Audience
- Relevant materials
- Conditions

**Function 3**

ORGANIZE MANAGEMENT
- Controls
- Feedback network
- Timelines

### STAGE II: DEVELOP

**Function 4**

IDENTIFY OBJECTIVES
- Terminal
- Enabling

**Function 5**

SPECIFY METHODS
- Types
- Conditions
- Formats

**Function 6**

CONSTRUCT PROTOTYPE
- Instructional events
- Evaluation design
- Technical review
- Produce materials



### STAGE III: EVALUATE

**Function 7**

TEST PROTOTYPE
- Field trial
- Collect evaluation data

**Function 8**

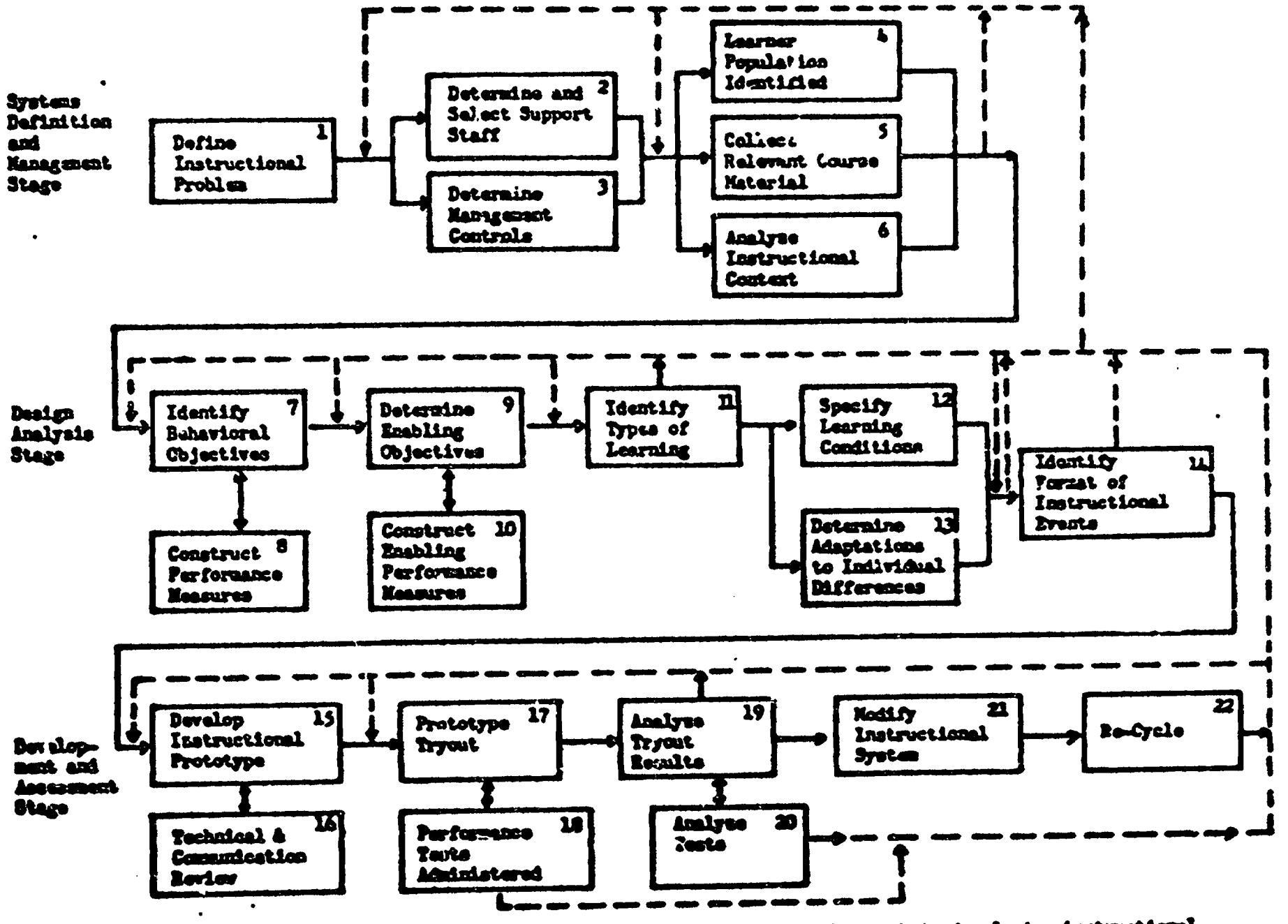
ANALYZE RESULTS
- Objectives achieved
- Prototype design
- Evaluation techniques

**Function 9**

IMPLEMENT/RECYCLE
- Review
- Decide
- Act

National Special Media Institutes
IDI Project
September 1970

Figure 3




Flow diagram showing the specific steps of the Systems Approach in developing instructional systems